what has been encountered, and one is driven to the conclusion that some portion of the thermal result is due to the internal heat of the earth arising from volcanic agency.

The energy and skill of those in control, amongst whom are Colonel Locher, Herrs Brandau, Pressel, Kager, Sulzer, and many others, are surmounting these difficulties, and it is anticipated that without any very great delay the junction of the headings will be effected.

Certainly no tunnelling operations in any part of the world have been exposed to such vicissitudes and difficulties, and when the arching of the tunnel is fully completed little will be left to show how hardly earned has been the victory over physical obstructions.

It is expected that within three months of the piercement trains will be running, and the railway will prove to be a most important link in the line of communication between Rome, Genoa, and Milan with Lausanne, Berne, and mid-Europe. FRANCIS FOX.

WATER-DROPPERS AND RADIUM COLLECTORS.

IT is more than forty years since Lord Kelvin commenced a new era in measurements of atmospheric electric potential by devising the water-dropper. Though marking a great advance, and simple in its construction, the water-dropper has not increased the happiness of those responsible for the conduct of self-recording meteorological instruments. It has weaknesses which it takes some time to discover, and which, when undetected, may lead to serious error. Some of the earlier forms had their water reservoirs so constructed that the pressure under which the jet issued varied considerably with the time since the reservoir was filled. Punctuality in filling the reservoir had in this case the disadvantage of accentuating a subsidiary diurnal variation not due to nature. The misdirected attention of spiders, variations of moisture, and other meteorological conditions, produce changes of insulation in the water tank; choking of the jet occasionally happens through impurities in the water, and in severe winters there may be complete stoppage through freezing of the jet. As this major catastrophe usually occurs at night, it generally entails a considerable loss of trace.

The idea of replacing the water jet by some radio-active substance presented itself pretty soon after the announcement of Becquerel's discoveries. The report of the International Meteorological Committee, which met at Southport in 1903, contains a note by Prof. Paulsen on his early use of a radio-active powder. This was spread on filter paper resting on a disc of copper, a thin covering plate of aluminium serving as a protection against rain. In this form the apparatus was used in Iceland in 1899–1900. M. La Cour modified this form by mixing the powder with caoutchouc into a paste, which was spread on a disc of copper, while a thin copper grating was pressed down on the top of the paste before it was quite dry. This form was used with satisfactory results in Finland in 1900–1. After wetting by rain, however, its efficiency was temporarily lessened. The same report also describes an instrument which M. Moureaux had had in use for some time at Parc St. Maur Observatory, Paris. It employs as collector chloride of radium in a shallow copper vessel, over which is soldered a plate of aluminium 0·1 mm. thick to keep out rain. Chloride possessing 5000 times the activity of uranium was not sensitive enough, but chloride with 30,000 times the activity of uranium gave good results. M. Moureaux so arranged matters that he could at pleasure record the electric potential, practically at a fixed point, either by the radium collector or a water jet. In this way he obtained an electrogram, successive portions of which were obtained in immediate sequence by the two collectors. Unless the times of the change had been indicated, one could not have told by inspection of the curve—which is reproduced in the report—which collector was being used. When M. Moureaux's note was written the radium had been in use for several months with satisfactory results. A foot-note, however, of later date, mentions that some months later the radium was found to have produced a number of minute holes in the aluminium, and that it was intended to dispense with the aluminium and protect the radium against rain by coatings of varnish. It was further hoped that this would admit of the use of cheaper chloride of less radio-activity.

The employment of radium is thus hardly out of the experimental stage, and any one adopting it at present would be well advised to check the action from time to time by recourse to a water jet. It would also be desirable to make sure before final adoption that the radium does not itself modify the potential which it is desired to record, more especially in calm weather. Whatever the final outcome may be, it is at least satisfactory that M. Moureaux's experiments showed agreement between the water jet and the radium collector when both were upon their good behaviour.

C. CHREE.

NOTES.

THE friends of Prof. G. Carey Foster, F.R.S., are taking the occasion of his recent retirement from the principalship of University College, London, as an opportunity of showing their appreciation of him by promoting a fund with the object of having his portrait painted for presentation to the council of the college, and a replica for presentation to Mrs. Foster. The president of the movement is the Right Hon. Lord Reay, G.C.S.I., and the vice-presidents are Sir Norman Lockyer, K.C.B., Sir Oliver Lodge, and Sir Arthur Rücker. Further information with regard to the scheme may be obtained from the secretaries of the fund, University College, Gower Street, W.C.

THE death is announced at Hamburg, on September 27, of Dr. H. Kortum, professor of mathematics at the technical college at Bonn.

THE Naples Academy of Physical and Mathematical Sciences offers prizes of 500 francs to the authors of the best papers in Latin, French, or Italian on the two following subjects: the processes of formation of urea in the animal organism, and the evolution of the ovaric ovum in the Selacii. The essays are to be sent in anonymously, bearing a motto, on or before June 30, 1905. The Padua Society of Encouragement offers, to Italian subjects only, two prizes of 5000 francs for an essay on the present state of the problem of electric traction on railways, and for a new method of diagnosing the disease of pellagra previous to its development. This competition closes on June 30, 1906.

A PETITION has been presented to His Majesty in Council asking for the grant of a charter of incorporation to the South African Philosophical Society under the name of "The Royal Society of South Africa."

MR. WILFRED MARK WEBB has accepted the honorary secretaryship of the Selborne Society.

THE death is announced of Dr. Tillaux, professor of surgery in the University of Paris, president of the Academy of Medicine, and Grand Officer of the Legion of Honour.

DR. DOYEN is stated by the Paris correspondent of the *Daily Chronicle* to have succeeded in isolating a micro-organism in cancer, and to have prepared a curative serum for the disease. It is proposed to institute a committee to investigate Dr. Doyen's claims and reputed cures.

AN appeal to the Danish people was issued at Copenhagen on October 18 for contributions to defray the cost of a monument to the late Prof. Niels Finsen, the discoverer of the light cure, and also for the establishment of a fund to be devoted to scientific and humanitarian purposes in accordance with his wishes.

ACCORDING to the *Daily Chronicle* of October 17, a specimen of the water-warbler (*Acrocephalus aquaticus*) has been taken at Clay-next-the-Sea, Norfolk. Up to the year 1894, at any rate, only three specimens of this warbler were definitely known to have been taken in Britain, one of these being now in the museum at Dover.

MR. A. W. ITTER informs the *Times* that while an artesian well was being sunk on his property near Aylesbury, at a depth approaching 500 feet, the whole tackle was blown out of the bore-hole, and after a "noise like thunder," lasting for several minutes, natural gas rushed out, and on being ignited burnt with a brilliant light. He states that when he wrote, on October 19, the gas had been issuing for forty-eight hours, and was still pouring out at a pressure of more than 50 lb. to the square inch.

THE *Times* correspondent at Copenhagen reports that shocks of earthquake were felt at 11.15 a.m. on October 23 throughout the Scandinavian countries. Disturbances occurred almost simultaneously at Stockholm, Christiania, Gothenburg, the northern part of Jutland, Malmö, and Copenhagen. The severest shock was in the Danish town of Aalborg. The earthquake was felt at Skagen, Frederikshavn, Hjörring, and Brönderslev, and in the Island of Laesö, but no serious damage was done. Telegrams from Christiania show that there was a great panic in the city.

THE British Fire Prevention Committee's programme for the new winter session, which has just commenced, includes the preparation and issue of a report on the great Baltimore conflagration. Further reports will be issued on various tests with sprinklers, lamps, and different forms of partitions. Arrangements are also being made for the organisation of branches of the committee in Canada, Australia, and New Zealand. The committee will assist in the preparation of the "International Technical Dictionary," which is being issued by the German Institution of Engineers, so far as technical terms regarding fire prevention are concerned.

MAJOR POWELL COTTON is about to start on another African expedition. The object of the journey, which is expected to occupy eighteen months, is to explore the extensive country lying between the Nile and the Zambesi. After investigating the Great Forest and the district to the west of Lake Kivu, the region to the west of Tanganyika will be traversed, and the expedition will then proceed south towards Katauga. Major Cotton expects to come out in British territory in Nyasaland, whence he will travel to the coast by the Zambesi. Every facility will be given to Major Cotton by the Belgian Government, and as he will travel the entire length of the Congo State, there is every reason to hope that much may be added to the knowledge of the natural history of this part of Africa.

A CORRESPONDENT suggests a means of obviating, in the ordinary form of Atwood's machine, the difficulty that the acceleration of the moving system is not constant, but increases continuously as more and more of the string passes over the pulley to the descending side. He proposes to connect the masses on both sides of the pulley to an endless cord, and so to ensure that the total length of string remains the same throughout.

A REPORT has been received from the members of the sleeping sickness expedition of the Liverpool School of Tropical Medicine. Writing from Lisala, on the Upper Congo, they state that they believe they are leaving the districts where sleeping sickness is rife. Investigations have been made into cattle disease in the Congo Free State, and measures have been devised which, it is hoped, will enable stock to be raised there without difficulty.

IT is stated that craw-craw, a common skin affection on the west coast of Africa, has made its appearance in Birmingham. The disease is due to a nematode worm allied to the filaria, and it is reported that Mr. J. D. Whittles, lecturer on dental histology and pathology in the University of Birmingham, has detected the worm in the blood of several persons. Confirmation of this observation will be awaited with interest.

WE have received the report of the Glasgow Municipal Commission on the Housing of the Poor. Among the many recommendations contained in it, one suggests that, with the view of encouraging private enterprise to erect suitable, sanitary, and cheap rented houses for the poorer classes, some relaxation of the provisions of the Building Regulations Act should be favourably considered by the corporation under proper safeguards.

IN the *Scientific Memoirs of the Government of India* (No. 11) Lieut. Christophers, I.M.S., gives additional particulars respecting the Leishman-Donovan body or parasite (see NATURE, vol. lxx. p. 534). He states that the bodies described by Wright in tropical ulcer are indistinguishable from those found in cases of enlarged spleen in Madras. The bodies may occur in the leucocytes in the peripheral blood, but have not been detected in the red blood cells.

THE "General Report and Statistics of Mines and Quarries," part ii., for 1903, is in many respects interesting reading. The general death rate from accidents of those employed in coal and metalliferous mines shows a steady decrease, having fallen from an average of about 2·25 per thousand during the years 1873–82 to 1·25 per thousand during the years 1898–1903. On the other hand, in the Cornish mines, and probably elsewhere, the death rate from phthisis among men from twenty-five to forty-five has very greatly increased during the last few years, and is attributable to the use of rock drills, which cause much dust. Reference is also made to the outbreak of ankylostomiasis in the Cornish mines.

FROM Mr. J. Wheldon, of Great Queen Street, we have received a catalogue of books and papers on invertebrates (other than insects).

IN the October number of *Nature Notes* the editor commences a series of papers on the geology of scenery, dealing in this instance with stratification.

ACCORDING to the annual report for 1903–4, the rate of additions to the industrial section (inclusive of ethnology) of the Indian Museum, Calcutta, is such that it is increasingly difficult to find space for the accommodation of

the new specimens. The superintendent has to report the theft during the year of a quantity of gold jewellery, of which no trace has been discovered.

ZOOLOGICAL papers received from America in our last week's batch include a treatise on Acarina, or mites, by Mr. N. Banks; notes on Hawaiian reptiles, by Mr. R. C. McGregor; on reptiles from Missouri, by Mr. J. Hurter; two molluscan papers by Mr. F. C. Baker, and a third, by Mr. T. L. Casey, on the gastropods of the family Pleurotomatidæ. The first two are published in the *Proceedings* of the U.S. National Museum, the rest in the *Transactions* of the St. Louis Academy.

THE *American Naturalist* for July and August contains a report of the proceedings of the first annual meeting of the eastern branch of the American Society of Zoologists, held in Philadelphia in December last. Of its other contents, perhaps the most interesting is a paper, illustrated with a coloured plate, by Mr. M. M. Mayland, on the colour-variation displayed by a small local form of the common marine gastropod *Neritina virginea*, which inhabits "Salt Pool," near Port Henderson, Jamaica, and is also found in a fresh-water stream in the same island. In the one instance the dwarfing is attributed to the extra salinity of the water, in the other to its freshness. The diversity in colour and colour-pattern of both the normal and the dwarf forms is extraordinary, and perhaps unparalleled, but all the variations intergrade.

MR. H. INGLE, who recently went from the Yorkshire College to take charge of the chemical work of the Transvaal Department of Agriculture, contributes a short paper to the department's Journal on the composition of Transvaal soils. About a dozen typical soils from different parts of the country have been examined by him. He finds that, as compared with English soils, Transvaal soils are somewhat markedly deficient in nitrogen and phosphoric acid, but he very properly points out that their fertility cannot be judged of entirely by European standards. The soils are in reality much better than analyses made in the ordinary way would lead us to suppose. When Dyer's method was employed the proportion of available to total phosphoric acid and potash was found to be high, much higher than is usually the case in this country. As a set-off to the natural poverty of the soils in nitrogen, Mr. Ingle indicates that the receipts of combined nitrogen from the atmosphere are probably higher in South Africa than in England. In February and March of this year, for example, the rainfall collected in Pretoria brought down about 2 lb. combined nitrogen per acre, whereas at Rothamsted the average annual receipts of the soil from this source amount to some $4\frac{3}{4}$ lb. only. In addition to nitrogenous manures, Transvaal soils require compounds supplying phosphoric acid and lime, and of the manures imported basic slag is suggested as likely to be most economical.

As a contribution to the volume which was prepared in honour of Dr. P. Ascherson's seventieth birthday, Dr. Stapf has written a sketch of the distribution of the grasses in South Africa. Two main subdivisions are distinguished, a smaller group of forms extending into the tropics and a larger endemic South African group, which includes subtropical and temperate forms. The tropical and subtropical species are allied to the palæotropic flora of tropical Africa; the temperate element has affinities with some grasses of Asia Minor and Australia, but how and when they have been connected is not obvious. There is an accumulation of temperate grasses, many of them endemic species, in the Cape district, which suggests that the land formerly extended further south.

ACCORDING to *Circulars* received, the Department of Agriculture in the United States, through the Bureau of Forestry, offers the services of its officers to farmers and landowners as advisers in the matter of tree planting and forest conservation. As for the conditions under which this help is given, preliminary examination is defrayed by the department, but if the undertaking is sufficiently extensive to require a survey and special plans, the owner has to pay actual and necessary expenses; the object is to prove to timber-land owners that conservative methods of lumbering will pay.

IN the *Revue Scientifique* of October 1 Prof. A. Thauziès, of Périgueux, resumes the discussion of the question as to the manner in which carrier-pigeons find their way home. In the same journal for March 24, 1900, Mr. de Cyon expressed the opinion that the sense of smell determines the proper direction, and it is to the refutation of this theory that the portion of the professor's article published in the issue before us is devoted. Among other points cited to disprove the olfactory theory is the fact that young pigeons are frequently unable to discover the whereabouts of their dovecot despite the overpowering odour issuing therefrom. In the concluding portion of his *critique*, published in the issue of October 8, Prof. Thauziès discusses the theory that homing pigeons orientate by a "sense of attitude." That is to say, they preserve a sense of direction by the number of times they have turned *en route*. After urging several strong and apparently fatal objections against this theory, Prof. Thauziès suggests that it may nevertheless contain a germ of truth. For the present, however, the "homing instinct" must remain a puzzle.

THE current number of the *Annals* of the Royal Botanic Gardens, Peradeniya, contains several papers of interest, and helps to emphasise the necessity for a thorough study of the problems presented by tropical vegetation. A paper by Mr. R. H. Lock is of particular value in this connection. By a careful study of the rate of growth of giant bamboos, Mr. Lock has found that the difference in rate of growth between day and night is due, not to the alternation of light and darkness, but to the change in the conditions of moisture, the air being damper at night. The curve of rate of growth follows that of moisture and rainfall with most surprising closeness. The second part of Mr. Herbert Wright's paper on Diospyros contains figures of the flowers, &c., in this genus, and shows the great need for study of tropical plants in the field as well as in the herbarium. The number also contains a paper by Dr. Svedelius on *Enalus acoroides*, the life-history of which he studied in the straits between Ceylon and India. The floral mechanism shows a very interesting difference from that of Vallisneria, correlated with the fact that Enalus is a marine plant. The male flowers are caught at low water and drawn under as the tide rises, pollination taking place subsequently. Another paper by Mr. R. H. Lock contains a preliminary statement of the results of the first "Mendelian" breeding work carried on in the tropics, and gives a number of interesting results with peas and maize, mentioned in last week's NATURE (p. 601).

THE report of the Meteorological Commission of Cape Colony for the year 1902 shows that the interest taken in the progress of meteorology by the public is increasing. Rainfall is observed at 500 stations; this number includes 58 second order (barometric) stations and 27 third order (thermometric) stations. The report also contains sum-

maries at a large number of stations in neighbouring colonies and in German South-West Africa. At the request of the Admiralty circulars were issued to all observers at second order stations south of 30° south latitude asking them to take observations at Greenwich noon, in connection with the National Antarctic Expedition.

THE U.S. Hydrographic Office has issued a handy pamphlet of instructions, prepared by Mr. J. Page, for the use of the voluntary meteorological observers who contribute information for the U.S. Monthly Pilot Chart; it will also be found very useful for all observers at sea. The number of vessels regularly engaged in its service exceeds 1800, and the list embraces the merchant marine of all nations, all the vessels of the U.S. Navy, and many foreign cruisers. The form of weather-register now in use was adopted in 1888; it provides only for a single daily observation, to be made at Greenwich noon, instead of the old form recommended by the International Maritime Congress held at Brussels in 1853, which provided for observations at several hours. The registers are generally returned by post in a foolscap envelope at the end of each month, and supply the information required for laying down tracks of storms, and for the preparation of mean values for each month, published in the valuable monthly pilot charts, to which notice has frequently been directed in our columns.

AN interesting article on the development of the theory of electrolytic dissociation is contributed to the *Popular Science Monthly* (September) by Prof. Svante Arrhenius.

IN the *Transactions* of the Academy of Science of St. Louis, Prof. Francis E. Nipher discusses the speed of the trotting horse as a function of the time, and applies the empirical equation $s=a+be^{-kt}$ to connect the speed s with the time t in the problem or problems, of which he gives numerical illustrations.

IN a short but suggestive paper contributed to the *Popular Science Monthly* (September), Dr. Allan McLaughlin discusses the problem of Hebrew, Magyar, and Levantine immigration. The first part deals with the persecution of the Jewish race in Europe, and the serious problem which America has to face in the building up of large ghettos in towns like New York by the overflowing stream of immigrants. Of the Magyar race only 27,124 subjects were landed in America in 1903, and these appear to be ideal immigrants but for their tendency to return to Europe. In regard to Levantine races, we are told that "the Greeks are the best of this rather bad lot."

SEVERAL interesting papers on radio-activity are contained in recent numbers of the *Atti dei Lincei* (xiii., 3, 4, 5). In the first of these numbers Drs. G. Martinelli and A. Sella give measurements of the radio-activity of the pozzolana from the neighbourhood of Rome. In the next Dr. G. Martinelli describes experiments to ascertain whether the reactions involving loss of weight (according to the theories of Landolt, Sanford, Ray, Heydweiller and others) are accompanied by radio-active phenomena. A figure is given of the apparatus, in which the reactions were produced inside a closed vessel in a dish placed under the electroscope; but though each experiment was continued for two hours no positive results were obtained. Lastly, Messrs. G. Pellini and M. Vaccari discuss the chemical actions produced by radium. They find that there are many chemical reactions produced by light on which radium has no effect, and that, as a general rule, the actions most affected are those provocated by ultra-violet light or Röntgen rays.

WE have received a reprint of a paper by Prof. H. Geitel which is published in the *Jahrbuch der Radioaktivität und Elektronik* under the title "Elektrizitätszerstreuung und Radioaktivität." It forms a valuable summary of the development of the study of terrestrial electricity from the time of Coulomb to the present.

IN No. 7 of the *Bulletin* of the Royal Academy of Belgium M. H. Gillot publishes an experimental investigation of the properties of mixtures of the sugars and of the polyhydric alcohols. Melting-point curves are given for binary mixtures of saccharose, lactose, glucose, mannitol, and dulcitol, which are of importance because they indicate the non-existence of isomorphism between these substances. On the other hand, the presence of more than one eutectic point in many of the curves probably means that in these cases definite compounds are produced.

A PROSPECTUS has been issued by the Berlin Wireless Telegraphy Company, "System Telefunken," which describes the organisation and scope of the company and the character of the apparatus covered by its patents. The company is an amalgamation of Messrs. Siemens and Halske and the Allgemeine Elektricitäts-gesellschaft of Berlin, and its system a combination of the Braun-Siemens and the Slaby-Arco systems. The company has already equipped more than fifty German warships with its appliances, and its system has been adopted by the United States Navy. An especial feature of the prospectus, which is excellently illustrated, is the description of a portable apparatus designed for military field service. The transmitter and receiver are arranged so that a variation of several hundred per cent. in the wave-length of the electric waves can be rapidly made; in this manner disturbances caused by the enemy may be eliminated.

MR. H. J. GLAISHER, of Wigmore Street, will shortly publish "X-Rays: their Treatment in Cancer and other Diseases," by Mr. R. J. Cowen.

PROF. MELDOLA has completed vol. i. of "The Chemical Synthesis of Vital Products and the Inter-relations between Organic Compounds," which is to be published by Mr. Edward Arnold on November 1.

THE syllabus of meetings for the session 1904–5 of the Hampstead Scientific Society gives full particulars of the subjects for the general meetings and for the separate meetings of the natural history, photographic, and astronomical sections.

A NEW edition of Mr. Joseph Y. Bergen's "Elements of Botany" has been published by Messrs. Ginn and Company. A more careful study has been made in this edition of typical cryptogamic forms, and an outline of the ecological classification of plants has been added, as well as chapters on the ecology of leaves and the evolutionary history of plants.

MESSRS. HEFFER AND SONS, Cambridge, have in the press a book by Mr. S. W. Cole entitled "Exercises in Practical Physiological Chemistry." The book, which is written for the use of medical students, is essentially a laboratory book, only those exercises being included which the author has found can be carried through in ordinary class work.

MR. W. B. CLIVE has published a revised and rewritten edition of "First Stage Magnetism and Electricity," by Dr. R. H. Jude. The section dealing with electrostatics has been curtailed and simplified, and a more practical

character given to the part on voltaic electricity. Under magnetism a brief account has been included of tubes of force, magnetic flux, permeability, and reluctance.

NEW editions of three standard works on botany have just reached us from Germany. One volume is the third edition of Prof. G. Haberlandt's "Physiologische Pflanzenanatomie" (Leipzig: W. Engelmann), the second edition of which was reviewed in NATURE of March 18, 1897 (vol. lv. p. 457). About sixty pages have been added to the work, and the number of figures has been increased from 235 to 264. Mr. Engelmann has also published the twelfth edition of Prantl's "Lehrbuch der Botanik," revised by Prof. F. Pax. The additional matter has enlarged the book by twenty-two pages, and twenty-five new figures have been included. The fourth revised edition of Prof. A. Engler's "Syllabus der Pflanzenfamilien" has been issued by the firm of Borntraeger Bros., Berlin. The work is a summary of systematic botany, with special reference to medicinal and useful plants, and a survey of kingdoms and regions of flowering plants; it is of particular value to students of special and pharmaceutical botany.

OUR ASTRONOMICAL COLUMN.

A NEW VARIABLE STAR.—A telegram received at the Kiel Centralstelle from Prof. E. C. Pickering, on October 7, states that the object discovered by Mr. Stanley Williams on September 20 is, according to its spectrum, a long period variable star.

On a plate obtained by Herr P. Gotz at Heidelberg on August 8·4 the star was fainter than B.D.+29°·4653, which has a magnitude of 9·2 (*Astronomische Nachrichten*, No. 3971).

EPHEMERIS FOR TEMPEL'S SECOND COMET.—In No. 3971 of the *Astronomische Nachrichten* M. J. Coniel publishes a continuation of his daily ephemeris for Tempel's second comet, extending from October 25 to January 1.

Abstracts of the previous portions have already appeared in these columns, and the following is from the present publication:—

Ephemeris 12h. (M.T. Paris).

1904	α app. h. m. s.	δ app. ° ′	log. Δ	$1 : r^2\Delta^2$
Oct. 25 ...	17 25 44 ...	−22 11 ...	0·2584 ...	0·156
,, 29 ...	17 39 37 ...	−22 50 ...	0·2608 ...	0·155
,, 31 ...	17 46 40 ...	−23 8 ...	0·2621 ...	—
Nov. 2 ...	17 53 46 ...	−23 25 ...	0·2634 ...	0·154
,, 4 ...	18 0 57 ...	−23 40 ...	0·2648 ...	—
,, 6 ...	18 8 11 ...	−23 54 ...	0·2662 ...	0·152
,, 8 ...	18 15 29 ...	−24 6 ...	0·2677 ...	—
,, 10 ...	18 22 49 ...	−24 17 ...	0·2692 ...	0·150

Although the comet was unsuccessfully sought during August and September, and, theoretically, its light should commence to diminish towards the end of the present month, the fact that at previous apparitions the light has been sensibly stronger after perihelion than before leads M. Coniel to hope that the object may yet be observed during its present return. As before mentioned in these columns, the feeble light of the comet, combined with its southerly declination, will render it a difficult object for observers in the northern hemisphere.

PHŒBE: SATURN'S NINTH SATELLITE.—The promised extended discussion of the observations of Phœbe by Prof. W. H. Pickering appears in No. 3, vol. liii., of the Harvard College Observatory *Annals*.

The discoverer of the satellite therein describes the first discovery of, and the subsequent searchings for, the object, explaining in detail the examination of the plates and the difficulties experienced in recognising the satellite's image.

Sixty photographs of Saturn have, so far, been obtained with the Bruce telescope, and of these twelve were taken when the planet was moving rapidly, and were therefore useless in locating the satellite's position. Several others were, for various reasons, useless, but the object sought is to be seen on forty-two plates, which are used in the discussion.

After preparing the description of the observations and results for the press, Prof. Pickering received information from Arequipa which considerably modified his ideas of the satellite's orbit. An approximate ephemeris had been sent to Prof. Bailey, at Arequipa, in March of this year, but he was unable to find the image of the satellite in the computed positions. Subsequent research has shown that the motion of this body in its orbit is probably retrograde, an unlooked-for possibility, since the other eight of Saturn's satellites all have direct motions. Consequently Prof. Pickering gives the details of the reductions for both retrograde and direct motion.

The elements, as determined for the case of retrograde motion, are as follow:—

Semi-major axis at a distance of 10 units measures 29′·62. This corresponds to a distance of 0·0862 astronomical unit, or 7,996,000 miles.

Eccentricity ... ... = 0·22
Inclination to ecliptic ... ... = 5°·1
Longitude of ascending node = 220°
,, ,, perisaturnium.. = 289°·7
Epoch of perisaturnium ... = 1900 Mar. 28·0 (G.M.T.)
Period ... ... = 546·5 days.

The inclination of the orbit of Phœbe to that of Saturn is, therefore, 6°·0, and the longitude of the ascending node is 170°·0.

The eccentricity is remarkable as being greater than that of any other satellite or major planet in the solar system.

The brightness of Phœbe is judged as two magnitudes fainter than that of Hyperion, which is assumed to be of the fourteenth magnitude. From photometric considerations the diameter of the satellite is thought to be about 200 miles.

In conclusion, Prof. Pickering gives a table showing the differences between the computed and the observed places of the satellite, and then discusses the deviations and gives an ephemeris for 1904.

FAINT STARS NEAR THE TRAPEZIUM IN THE ORION NEBULA.—The lists of stars in the Orion nebula recently published by Profs. Wolf and Pickering included none of the stars near the Trapezium, because, with the short-focus cameras used in obtaining their plates, the images of the stars in that region were blotted out by the bright nebula.

On the plates obtained by Prof. Ritchey in 1900 and 1901, using the Yerkes 40-inch telescope with a yellow screen placed immediately in front of the plate, these fainter stars are easily seen, therefore Mr. J. A. Parkhurst has measured their coordinates from θ' Orionis, and gives these, together with the magnitudes of the stars, in a list published in the September number of the *Astrophysical Journal*. The list contains forty-two stars, all within two minutes of arc of the trapezium star θ' Orionis, of which twenty-three were observed visually by Bond—these include ten observed photographically by Prof. Pickering—whilst nineteen are presumably catalogued for the first time.

PHOTOGRAPHIC DETERMINATION OF PARALLAX.—Encouraged by the successful photographs obtained by Prof. Ritchey with the Yerkes 40-inch telescope, Mr. Frank Schlesinger tried several exposures with the same instrument for the determination of several stellar parallaxes. The yellow screen used in the former work was found to be unnecessary, and, as it introduced several troublesome errors, it was dispensed with.

The great focal length of the instrument renders errors in measuring the plates much less important than when smaller instruments, such as those used in the production of the astrographic chart, are used, and Mr. Schlesinger computes the probable error for one exposure to be only ±0″·030.

Among the results obtained there occurs the parallax of the star *Krueger* 60 (R.A. = 22h. 24m., dec. = +57° 10′), which was placed on the working list because Prof. Barnard suggested that it has a large parallax. The result shows that the suggestion is probably correct, and, if confirmed by other measures, it places the star as one of our nearest neighbours, its parallax being +0″·278. This value was obtained as the result of measuring eight plates, containing twenty exposures, and using five comparison stars (*Astrophysical Journal*, No. 2, vol. xx.).